

REMARKS

Claims 1 and 4-18 are currently pending in this application. Claims 1 and 16 have been amended. Claims 2 and 3 have been cancelled without prejudice to or disclaimer of the subject matter contained therein. Claims 5-15, 17 and 18 have been withdrawn as being directed to non-elected subject matter.

Claim 1 has been amended to limit the "uniformly aligned template" i) to be a template of which the molecules are aligned or oriented in one direction, ii) to be a specific polymer film or three-dimensional polymer mass or a crystal of organic or organometallic compound, and iii) to be prepared by polymerization of the specific reactants having a general formula of E-[C]-E. In accordance with the amendment, claims 2 and 3 have been cancelled. Support for the amendments can be found throughout the specification as originally filed, including paragraphs [0033], [0034], [0044], [0058] and [0059] of the specification.

Claim 16 has been amended to incorporate several specific steps for the preparation of the uniformly aligned polymer film and to limit the structure of the reactants used for the preparation to those having a general formula of E-[C]-E. Support for the amendment can be found throughout the specification as originally filed, including paragraphs [0046], [0059] and [0060] of the specification.

The amendments to or the cancellation of the claims are solely for advancing prosecution. Applicants, by amending any claims herein, make no admission as to the validity of any rejection made by the Examiner against any of these claims. Applicants

reserve the right to reassert the original claim scope of any claim amended herein, in a continuing application.

No new matter has been introduced to this application within the meaning of 35 U.S.C. §132.

In view of the following, further and favorable consideration is respectfully requested.

- I. At page 4 of the Official Action, claims 1, 2 and 4 are rejected under 35 U.S.C. §103(a) as being unpatentable over Yoon et al. (J. Am. Chem. Soc., 2001, 123, pp. 9769-9779.***

As the basis for this rejection, the Examiner states in relevant part:

... Yoon fails to teach that the polyelectrolyte layer is uniformly aligned. It would have been obvious to one of ordinary skill in the art at the time of the invention that the layered polyelectrolyte structure would be uniformly aligned. The disclosure in Yoon that the zeolite material templated by the polyelectrolyte layer displays a highly ordered uniform alignment would lead one of ordinary skill in the art at the time of the invention to conclude that the structure directing polyelectrolyte layer must also be uniformly aligned.

Applicants respectfully traverse this rejection. To establish a *prima facie* case of obviousness, the PTO must satisfy three requirements. First, as the U.S. Supreme Court recently held in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398 (2007), "a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions. ... it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does... because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed

discoveries almost of necessity will be combinations of what, in some sense, is already known.” Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *Amgen Inc. v. Chugai Pharm. Co.*, 18 USPQ 1016, 1023 (C.C.P.A 1970). Lastly, the prior art references must teach or suggest all the limitations of the claims. *In re Wilson*, 165 USPQ 494, 496 (C.C.P.A. 1970).

In the present application, a *prima facie* case of obviousness has not been established by the Examiner since *Yoon et al.* fails to teach or suggest all the limitations of presently pending claims 1 and 4, as follows.

The Present Subject Matter

The present subject matter relates to a method for preparing a uniformly aligned zeolite supercrystal by growing the crystals of a zeolite or zeotype material in a uniformly aligned template of which the molecules are ***aligned or oriented in one direction***. Claim 1, as amended, recites “A method for preparing a uniformly aligned zeolite supercrystal, comprising growing a crystal of a zeolite or zeotype material in a uniformly aligned template, whereby said uniformly aligned zeolite supercrystal is prepared, wherein said uniformly aligned template is a template of which the molecules are aligned or oriented in one direction, said uniformly aligned template is a polymer film or three-dimensional polymer mass capable of releasing an amine group under an acidic or alkaline condition; or a crystal of organic or organometallic compound having functional groups of urethane, urea, ester, amide, amine or imide, and said uniformly

aligned polymeric template is prepared by polymerization of reactants having three moieties represented by the general formula of E-[C]-E, wherein E represents an end moiety containing at least one functional group and C represents a central moiety.”

Rejected claim 2 has been cancelled. Claim 4 is dependent from claim 1, thus it incorporates all of the limitations of claim 1 as noted above.

Yoon et al.

Yoon et al. describes a method to fabricate layer-by-layer (multilayer) assembly of micrometer-sized zeolite crystals on glass plates by ionic interaction between the surface-bound full-fledged ionic centers, by employing multiple, alternately layered and oppositely charged polyelectrolytes, as the linker, with excellent degree of coverage and close packing in each layer up to the third layer. That is, *Yoon et al.* describes multilayered zeolite crystals on glass plates utilizing polyelectrolytes, as a linker, having many charged groups.

However, the polyelectrolytes of *Yoon et al.* are ***not a template*** for preparing a uniformly aligned zeolite crystal but instead are used as ***a linker***. The polyelectrolytes, such as, Na^+PSS^- [poly (sodium 4-styrene-sulfonate)] and PDDA^+Cl^- [poly(diallyldimethylammonium chloride)] used in the process of *Yoon et al.* have many charged functional groups, and thus provide ionic bonds to fasten the zeolite crystal on the glass substrate, or to lower the layered zeolite crystal. The direction of these ionic bonds of the multilayered polyelectrolytes, however, is ***not unidirectional*** but is nondirectional or omnidirectional. This is very clear from the description from the

bottom of the left column to the top of the right column at page 9774 of *Yoon et al.*, as below.

[T]his result may reflect that ionic linkages are much more favorable than covalent linkages. This is conceivable in the sense that ***ionic bonding is nondirectional or omnidirectional*** and can also tolerate slight variation in the distance between the positive and negative centers, while covalent linkages require stringent angles and distances for the approaching functional groups for successful formation of linkages. [Emphasis added]

As such, because their ionic bonds are nondirectional or omnidirectional, the polyelectrolytes disclosed in *Yoon et al.* ***cannot*** serve a uniformly aligned template of which the molecules are aligned or oriented in one direction, as required in present claim 1.

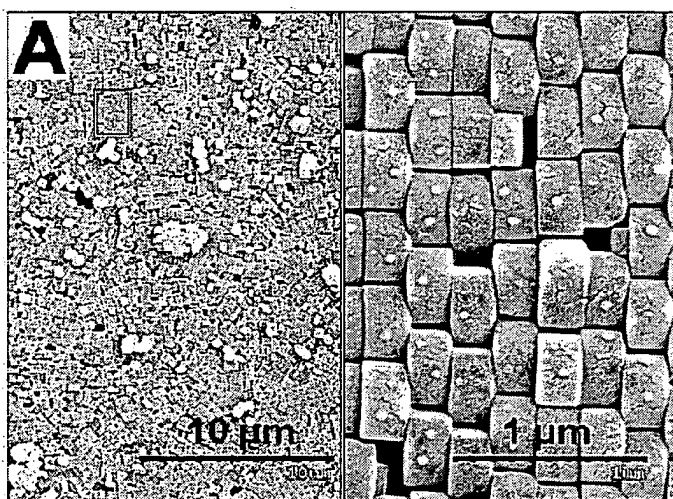
This distinctive feature is confirmed by the structure of multilayered zeolite crystals as displayed in Figure 1 of panel C in *Yoon et al.*, as below. As clearly shown in panel C, the multi-layered zeolite crystals of *Yoon et al.* are not uniformly aligned but they show multi-directional feature.

[Figure 1 of panel C of *Yoon et al.*]

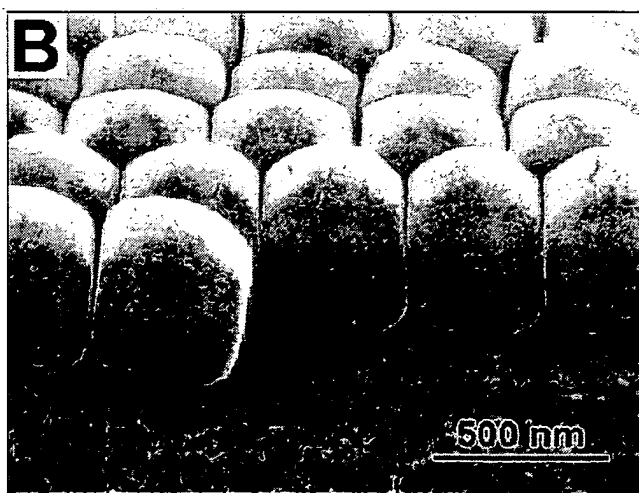


In contrast, the presently claimed zeolite supercrystals are uniformly aligned since they are prepared using a uniformly aligned template of which the molecules are aligned or oriented in one direction, as shown in Figures 8A and 8B of the present application as below. Figures 8A and 8B represent SEM images of silicalite-1 supercrystal uniformly aligned with c-axis perpendicular to the substrate plane.

[Figure 8A of the present application]



[Figure 8B of the present application]



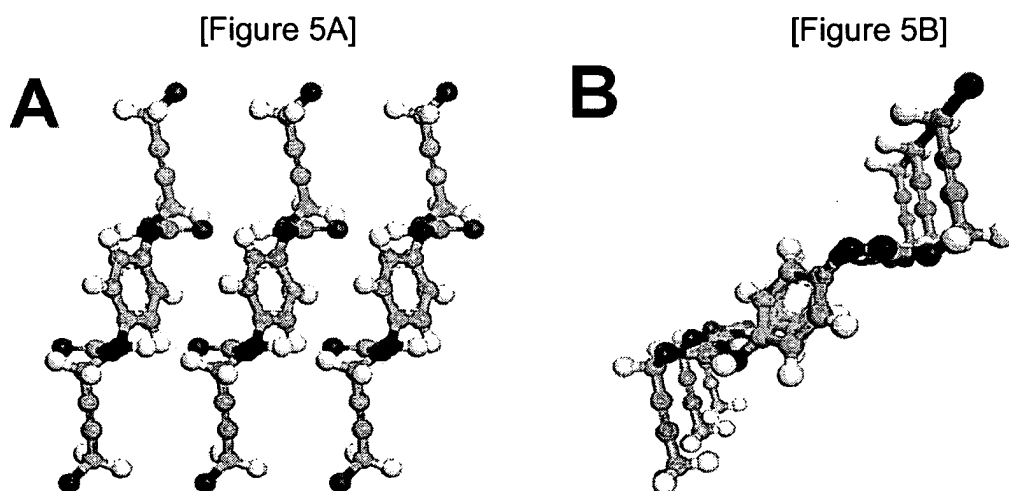
From the distinctively different direction or alignment of the resulting zeolite crystals between the present subject matter and the disclosure of *Yoon et al.*, as shown in the above pictures, it is evident that the polyelectrolytes used in the method of *Yoon et al.* are not such a uniformly aligned template structure as is required in the present subject matter. Accordingly, contrary to the Examiner's indication in the Official Action that "the disclosure in Yoon ... would lead one of ordinary skill in the art at the time of the invention to conclude that the structure directing polyelectrolyte layer must also be uniformly aligned," the ordinary person would conclude that the polyelectrolytes of *Yoon et al.* cannot be a uniformly aligned template and therefore they cannot serve as uniformly aligned supercrystals.

In addition to the above, Applicants also note that the specific materials of the template, as defined in claim 1, are not described in or suggested by *Yoon et al.*

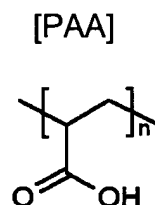
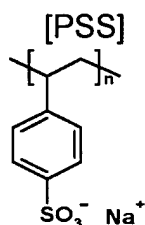
In particular, the template of a crystal of organic or organometallic compound having functional groups of urethane, urea, ester, amide, amine or imide, as recited in present claim 1, is not described in or suggested by *Yoon et al.* Further, a polymer film or three-dimensional polymer mass capable of releasing an amine group under an acidic or alkaline condition is not taught or suggested by *Yoon et al.*

Furthermore, the uniformly aligned template of polymer film or three-dimensional polymer mass prepared from polymerization of the reactants having three moieties represented by a general formula of E-[C]-E, wherein E represents an end moiety containing at least one functional group and C represents a central moiety, is not taught

or suggested by Yoon et al. The reactants of present claim 1 can produce a uniformly aligned template structure by means of its unique chemical structure. That is, the reactants of a general formula of E-[C]-E can be polymerized and compactly packed to a uniformly aligned structure through the inter-chain interaction. In this regard, Figures 5A and 5B of the present application display the uniformly aligned structure of the polymer molecules of the present template made from the reactants of a general formula of E-[C]-E.



In contrast, polyelectrolytes are polymers whose repeating units bear an electrolyte group. Charged molecular chains play a fundamental role in determining structure, stability and the interactions of various molecular assemblies. Chemical structures of two representative synthetic polyelectrolytes, poly (sodium styrene sulfonate) (PSS) and polyacrylic acid (PAA) are shown below.



From the structures, it is evident that polyelectrolytes are *impossible* to construct a uniformly aligned structure mainly due to their chemical structures having large size charged groups.

As such, since the function and the characteristics of the specific materials of the presently claimed template distinctly differ from those of the polyelectrolytes of *Yoon et al.*, it would have not been obvious to a person of ordinary skill in the art to modify the polyelectrolytes as disclosed in *Yoon et al.* to a uni-directionally aligned template for preparing uniformly aligned zeolite supercrystal, as required by the present claims.

Applicants respectfully submit that nothing in *Yoon et al.* renders the presently claimed subject matter obvious within the meaning of 35 U.S.C. §103. Thus, reconsideration and withdrawal of this rejection of present claims 1 and 4 is respectfully requested.

II. At page 5 of the Official Action, claim 16 is under 35 USC §103(a) as being unpatentable over Yoon et al., as above, in view of Baldo et al. (Adv. Mater., 1998, 10, No. 18, pp. 1505-1514).

As the basis for this rejection, the Official Action states in relevant part:

Yoon fails to disclose a method for forming the template that meets the requirements of the instant claim.

... It would have been obvious to a person of ordinary skill in the art to use the process described in Baldo to form a polymer film template for use in the process disclosed by Yoon. Such a modification would have been

motivated by the teaching in Yoon that ordered zeolites may be produced by utilizing a multilayer polymer template on a substrate, and the disclosure in Baldo that the vapor deposition process allows for the formation of a highly uniform polymer film. Therefore, the use of the process disclosed by Baldo would result in a template material with increased infirmity. It would have been obvious to one of ordinary skill in the art ... that the polymer film produced by the method disclosed in Baldo would be uniformly aligned. The method meets the requirements of the method required in the instant claim, and would therefore be expected to produce a material meeting the requirements of the instant claim. It would have been further obvious to one of ordinary skill in the art at the time the invention to cycle the deposition steps in the method disclosed by Baldo. Such a modification would allow for the production of multilayer polymer films, increasing the industrial applicability of the process disclosed by Baldo and the teaching in Yoon that the polymer may be in the form of a multilayer film.

Applicants respectfully traverse this rejection. Again, to establish a *prima facie* case of obviousness, the PTO must satisfy three requirements. First, as the U.S. Supreme Court recently held in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398 (2007), "a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions. ... it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does... because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *Amgen Inc. v. Chugai Pharm. Co.*, 18 USPQ 1016, 1023 (C.C.P.A 1970). Lastly, the prior art references must teach or

suggest all the limitations of the claims. *In re Wilson*, 165 USPQ 494, 496 (C.C.P.A. 1970).

In the present application, a *prima facie* case of obviousness has not been established by the Examiner since neither *Yoon et al.* nor *Baldo et al.* teach or suggest all the limitations of present claim 16, as follows.

Claim 16

Present claim 16, as amended, is directed to "A method for preparing a uniformly aligned zeolite supercrystal comprising growing a crystal of a zeolite or zeotype material in a uniformly aligned template, whereby said uniformly aligned zeolite supercrystal is prepared, wherein said uniformly aligned template is prepared by the method comprising the steps of: (a) injecting a vapor of a first reactant into a reactor containing a substrate to form a covalent bond between a functional group of said first reactant and a functional group on said substrate; (b) injecting a vapor of a second reactant into said reactor to form a covalent bond between a functional group of said second reactant and a functional group of said first reactant covalently linked to said functional group on said substrate; (c) when three or more reactants are used, injecting a vapor of a following reactant into said reactor to form a covalent bond between a functional group of said following reactant and a functional group of a previous reactant; and (d) cycling the steps (a)-(c), wherein a functional group of said first reactant is covalently linked to a functional group of a final reactant; and wherein said reactants have three moieties represented by the general formula of E-[C]-E, wherein E represents an end moiety

containing at least one functional group and C represents a central moiety.”

Yoon et al.

The above discussion regarding *Yoon et al.* is incorporated herein by reference in its entirety, for brevity. As discussed, nowhere does *Yoon et al.* teach or suggest a unidirectionally aligned template for preparing a uniformly aligned zeolite supercrystal.

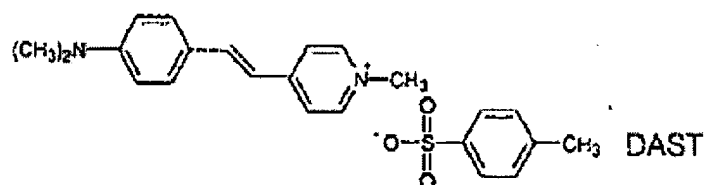
In addition, as the Examiner acknowledges in the Official Action, nowhere does *Yoon et al.* describe a method for forming the template as specified in claim 16.

Baldo et al. cannot remedy the deficiencies of Yoon et al.

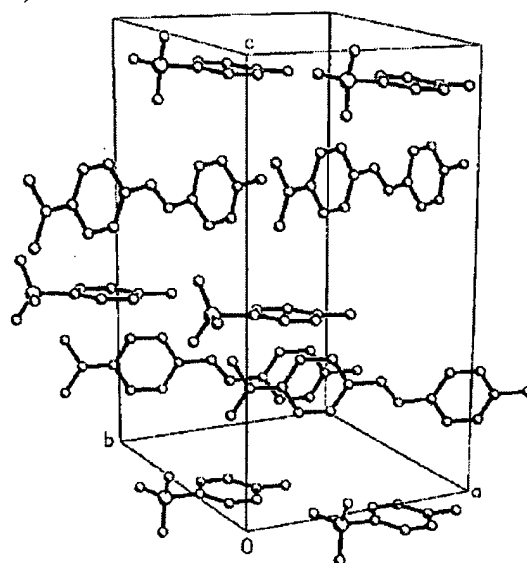
Baldo et al. cannot cure the deficiencies of *Yoon et al.* Not only does *Baldo et al.* not teach or suggest a method for forming the template that meets the requirements of present claim 16, but also *Baldo et al.* does not teach or suggest the specific steps for preparing the template, as recited in claim 16.

Specifically, *Baldo et al.* describes a method for fabricating a thin layer of crystalline of organic salts. *Baldo et al.* describes a thin layer of DAST (4'-dimethylamino-N-methyl-4-stilbazolium tosylate) salt prepared by the process of OVPD (organic vapor phase deposition). As clearly shown in Figure 2 of *Baldo et al.*, DAST is in the form of **salt**. Also, the molecules of DAST salt in the crystal unit cell are **not linked to each other via covalent bonds** but are bound to each other with coulombic interaction. The molecules of DAST are **not uniformly aligned**, either, as seen in Figure 2 of *Baldo et al.*, as below.

[Figure 2 of Baldo et al.]



b)



In contrast, present claim 16 requires that the sequential reactants are covalently linked to each other to form uniformly aligned polymer film; the reactants have three moieties represented by general formula of E-[C]-E, wherein E represents an end moiety containing at least one functional group and C represents a central moiety. As discussed above regarding claim 1, the unique chemical structure of the reactants having a general formula of E-[C]-E makes the resulting polymer have a compactly packed and uniformly aligned structure.

Accordingly, neither Yoon et al. nor Baldo et al., taken alone or in combination,

teach all of the elements of presently pending claim 16, as required by *In re Wilson*.

Applicants respectfully assert that nothing in *Yoon et al.* or *Baldo et al.*, taken alone or together, renders present claim 16 obvious within the meaning of 35 U.S.C. §103. Thus, reconsideration and withdrawal of this rejection of claim 16 is respectfully requested.

III. At page 6 of the Official Action, claims 1-4 are rejected under 35 USC §103(a) as being unpatentable over Lee et al. (Adv. Mater., 2001, 13 No. 16, pp. 1259-1263) in view of Raukola (Thesis, VTT Publications 361, Espoo, 1998).

As the basis for this rejection, the Official Action states in relevant part:

Lee discloses a method for production of zeolite materials utilizing polyurethane foam template ... Lee fails to teach that the polymer foam templates are uniformly aligned. *Raukola* teaches a biaxially aligned polymer foam. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to utilize an aligned polyurethane film as the template in the process disclosed by Lee. Such a modification would have been motivated by the teaching in *Raukola* of biaxially oriented polymer foams, and the teaching in Lee that the zeolite produced utilizing a polyurethane foam template displays the structure of the template. The combination of these teachings would allow for the production of a uniformly aligned structure of zeolite crystals with a more versatile industrial applicability than randomly oriented zeolite materials.

Applicants respectfully traverse this rejection. To establish a *prima facie* case of obviousness, the PTO must satisfy three requirements. First, a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions. *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398 (2007). Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the

time the invention was made. *Amgen Inc. v. Chugai Pharm. Co.*, 18 USPQ 1016, 1023 (C.C.P.A 1970). Lastly, the prior art references must teach or suggest all the limitations of the claims. *In re Wilson*, 165 USPQ 494, 496 (C.C.P.A. 1970). However, in the present application, a *prima facie* case of obviousness has not been established by the Examiner since neither *Lee et al.* nor *Raukola* teaches or suggests all the limitations of presently pending claims 1 and 4, as follows.

The Present Subject Matter

As discussed above, the present subject matter relates to a method for preparing a uniformly aligned zeolite supercrystal by growing the crystals of a zeolite or zeotype material in a uniformly aligned template of which the molecules are ***aligned or oriented in one direction***. Claim 1, as amended, recites "A method for preparing a uniformly aligned zeolite supercrystal, comprising growing a crystal of a zeolite or zeotype material in a uniformly aligned template, whereby said uniformly aligned zeolite supercrystal is prepared, wherein said uniformly aligned template is a template of which the molecules are aligned or oriented in one direction, said uniformly aligned template is a polymer film or three-dimensional polymer mass capable of releasing an amine group under an acidic or alkaline condition; or a crystal of organic or organometallic compound having functional groups of urethane, urea, ester, amide, amine or imide, and said uniformly aligned polymeric template is prepared by polymerization of reactants having three moieties represented by the general formula of E-[C]-E, wherein E represents an end moiety containing at least one functional group and C represents a central moiety."

Rejected claims 2 and 3 have been cancelled. Claim 4 is dependent from claim 1, and it incorporates all of the limitations of claim 1 as noted above.

Lee et al.

Lee et al. discloses a method for production of zeolite materials utilizing polyurethane **foam** template. As discussed below regarding *Raukola*, *Raukola* also discloses a polypropylene foam film. If a template in the form of foam is used for preparation of a zeolite crystal, the resulting fabricated zeolite crystal will take the form of foam. That is, the resulting zeolite crystal will become **a micro/macro porous** zeolite crystal, which cannot be a uniformly aligned structure of which the molecules are aligned or oriented in one direction, as required by the present claims.

Specifically, the object of the method as disclosed in *Lee et al.* is to provide a new process to prepare rigid, self-supporting zeolite monoliths with ramified macropores for easier internal molecular diffusion by using a polyurethane foam template. As confirmed by the disclosure in Lee et al., in the middle part of the left column of page 12, the foam template contains many pores within them.

"[A]s a means to overcome such practical problems associated with applying zeolites, zeolite scientists have attempted to develop synthetic methods to prepare rigid, **self-supporting zeolite monoliths with ramified macropores** for easier internal molecular diffusion [8±15].

Such zeolite monoliths with ramified macropores can be classified as micro/macroporous mixed porous materials. There are also reports on the preparation of the related meso/macroporous [16±21] or just macroporous materials [22±38].

Thus, in respect to the recent, tremendous interest in preparing the above various porous materials, the development of novel procedures to prepare large micro/macroporous monoliths is of great interest. We now introduce a

novel method that features the following. ***The resulting zeolite monoliths have highly ramified networks of interconnecting macropores for easy molecular diffusion.*** The size and shape of the interconnecting macropores, the thickness and morphologies of the films surrounding the macropores, and the three-dimensional structures of the zeolite monoliths can be easily tailored. The required templates for macropores are inexpensive, highly versatile, and readily available. The procedure is very simple, reproducible, requires short periods, yields pure products, and is even suitable for large-scale mass production.

The key to such a success arises from the utilization of polyurethane foams (PUFs) as the templates. [Emphasis added]

In addition, as confirmed by the SEM images of PUFs (poly-urethane foams) 1a and the resulting SLF (silicate-1 foam) prepared with the template of PUFs, as below, a thin film of SLF (silicate-1 foam) having a discrete architecture of open macro-porous cells is prepared, when PUFs (poly-urethane foams) are used as a template, as seen in the respective panels a - d of Figure 1 in *Lee et al.*

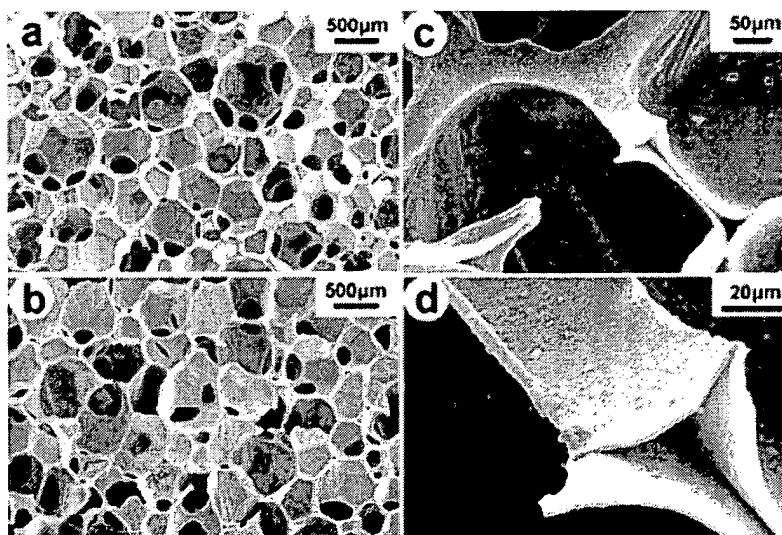


Fig. 1. SEM images showing the morphologies and connectivity of the macroporous cells of PUF (a), the resulting SLF (b), and the typical SLF strut at two different magnifications (c) and (d).

For the same, *Lee et al.* describes, at the lower part of the left column of page

1261, the structure of SLF in Figure 1 as a discrete architecture of open macroporous cells and struts.

"[T]he SEM images of the cross sections of the SLF struts (typically shown in Fig. 1c and 1d) reveal the remarkable fact that the whole body of the SLF, in fact, consists of a single piece of very thin silicalite-1 film shaped into **a discrete architecture of open macroporous cells and struts.**"

Accordingly, if a template in the form of foam, as disclosed in *Lee et al.*, is used to prepare a zeolite crystal, it never can be expected that the resulting zeolite crystal will have a uniformly aligned structure.

Accordingly, *Lee et al.* cannot teach or suggest all of the limitations of presently pending claim 1 and its dependent claim 4.

Raukola cannot remedy the deficiencies of Lee et al.

Raukola teaches a method for manufacturing a **biaxially oriented** foam film. In the present method of claim 1, the crystal of a zeolite or zeotype material is grown in a uniformly aligned template. As clearly recited in present claim 1, as amended, the uniformly aligned template is a template of which the molecules are aligned or oriented in **one direction**. Thus, *Raukola* fails to teach or suggest a uniformly aligned template of which the molecules are aligned or oriented in one direction as defined in present claim 1.

In addition, *Raukola* teaches the method to prepare a film in the form of **foam**. Accordingly, the same obstacles as those of *Lee's* method exist in the method of *Raukola* in order to prepare a uniformly aligned zeolite crystal. Accordingly, *Lee et al.* and *Raukola*, taken alone or together, cannot teach or suggest all the limitations of

present claims 1 and 4.

Applicants respectfully assert that nothing in *Lee et al.* or *Raukola*, taken alone or together, renders present claims 1 and 4 obvious within the meaning of 35 U.S.C. §103. Thus, reconsideration and withdrawal of this rejection of claims 1 and 4 is respectfully requested.

IV. At page 7 of the Official Action, claim 16 is rejected under 35 USC §103(a) as being unpatentable over Lee et al., as above, in view of Baldo et al. (Adv. Mater., 1998, 10, No. 18, pp. 1505-1514).

As the basis for this rejection, the Official Action states in relevant part:

Lee fails to disclose a method for forming the template that meets the requirements of the instant claim. ... It would have been obvious to a person of ordinary skill in the art to use the process described in Baldo to form a polymer film template for use in the process disclosed by Lee. Such a modification would have been motivated by the teaching in Lee that the zeolite produced utilizing a polyurethane template displays the structure of the template, and the disclosure in Baldo that the vapor deposition process allows for the formation of a highly uniform polymer film. Therefore, the highly uniform material produced by Baldo would result in a zeolite material with increased uniformity. It would have been obvious to one of ordinary skill in the art ... that the polymer film produced by the method disclosed in Baldo would be uniformly aligned. The method meets the requirements of the method required in the instant claim, and would therefore be expected to produce a material meeting the requirements of the instant claim. It would have been further obvious to one of ordinary skill in the art at the time the invention to cycle the deposition steps in the method disclosed by Baldo. Such a modification would allow for the production of multilayer polymer films, increasing the industrial applicability of the process disclosed by Baldo.

Applicants respectfully traverse this rejection. As discussed above, to establish a *prima facie* case of obviousness, the PTO must satisfy three requirements. First, a court must ask whether the improvement is more than the predictable use of prior art

elements according to their established functions. *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398 (2007). Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *Amgen Inc. v. Chugai Pharm. Co.*, 18 USPQ 1016, 1023 (C.C.P.A. 1970). Lastly, the prior art references must teach or suggest all the limitations of the claims. *In re Wilson*, 165 USPQ 494, 496 (C.C.P.A. 1970). However, in the present application, a *prima facie* case of obviousness has not been established by the Examiner since neither *Lee et al.* nor *Baldo et al.* teaches or suggests all the limitations of presently pending claim 16, as follows.

Claim 16

Presently pending claim 16, as amended, is directed to "A method for preparing a uniformly aligned zeolite supercrystal comprising growing a crystal of a zeolite or zeotype material in a uniformly aligned template, whereby said uniformly aligned zeolite supercrystal is prepared, wherein said uniformly aligned template is prepared by the method comprising the steps of: (a) injecting a vapor of a first reactant into a reactor containing a substrate to form a covalent bond between a functional group of said first reactant and a functional group on said substrate; (b) injecting a vapor of a second reactant into said reactor to form a covalent bond between a functional group of said second reactant and a functional group of said first reactant covalently linked to said functional group on said substrate; (c) when three or more reactants are used, injecting a vapor of a following reactant into said reactor to form a covalent bond between a

functional group of said following reactant and a functional group of a previous reactant; and (d) cycling the steps (a)-(c), wherein a functional group of said first reactant is covalently linked to a functional group of a final reactant; wherein said reactants have three moieties represented by the general formula of E-[C]-E, wherein E represents an end moiety containing at least one functional group and C represents a central moiety.”

Lee et al.

The above discussion regarding *Lee et al.* is incorporated herein by reference in its entirety, for brevity. To summarize, nowhere does *Lee et al.* teach or suggest a unidirectionally aligned template for preparing a uniformly aligned zeolite supercrystal, as required by the present claims.

In addition, as the Examiner acknowledges in the Official Action, nowhere does *Lee et al.* describe a method for forming the template as specified in claim 16.

Baldo et al. cannot remedy the deficiencies of Lee et al.

Baldo et al. cannot cure the deficiencies of *Lee et al.* In this regard, the discussion of *Baldo et al.*, above at pages 19 and 20 of this paper, is incorporated herein by reference in its entirety. To summarize, not only does *Baldo et al.* fail to teach or suggest a method for forming the template that meets the requirements of the instant claim, but *Baldo et al.* also fails to teach or suggest the specific steps for preparing the template as recited in claim 16. The thin layers of DAST salt as disclosed in *Baldo et al.* are not linked to each other via covalent bonds but are bound to each other with coulombic interaction, and the molecules of DAST are not uniformly aligned.

In contrast, in present claim 16, it is required that the sequential reactants are covalently linked to each other to form a uniformly aligned polymer film; and the reactants have three moieties represented by a general formula of E-[C]-E. The unique chemical structure of the reactants makes the resulting polymer have the structure compactly packed and uniformly aligned.

Accordingly, neither *Lee et al.* nor *Baldo et al.*, taken alone or in combination, teach all of the elements of presently pending claim 16, as required by *In re Wilson*.

As such, Applicants respectfully assert that nothing *Lee et al.* and *Baldo et al.*, taken alone or together, renders the presently claimed subject matter obvious within the meaning of 35 U.S.C. §103. Thus, reconsideration and withdrawal of this rejection of claim 16 is respectfully requested.

CONCLUSION

In view of the foregoing, Applicants submit that the pending claims are in condition for allowance. Early notice to this effect is earnestly solicited. The Examiner is invited to contact the undersigned attorney if it is believed such contact will expedite the prosecution of the application.

If the Examiner has any questions or comments regarding this matter, he is welcomed to contact the undersigned attorney at the below-listed number and address.

In the event this paper is not timely filed, applicants petition for an appropriate extension of time. Please charge any fee deficiency or credit any overpayment to Deposit Account No. 14-0112.

Respectfully submitted,

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Date: February 17, 2010

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